



Talking Green with Veera Sekaran

Standing by Green

Interview by Chris Low
Images by Greenology Pte Ltd

Green is not a colour.

Green is not a movement.

Green is not a state of being.

Green, is a verb; it is an action that we can all take.

Greening our world, one wall at a time. This is the mantra of Greenology, a local urban greening solutions firm set up in 2008. Since then, Greenology has grown into a serious practice that balances the art and science of greening, resulting in a series of planting technologies such as GVG (Greenology Vertical Greenery). The latter consists of engineered panels that carry plant-growing media, allowing more than 500 tested plant species to survive, supported by the brand's irrigation and fertigation (irrigated fertiliser) drip system programmed to timer precisions. Even after the success of developing the first and currently only green wall system to be rated fire-resistant by TÜV SÜD PSB, Greenology remains rooted in its research and earnestness to green the world.

It is clear that the fundamental concerns for Greenology founder and botanist Veera Sekaran have always been to provide the best conditions for plants to grow and flourish. A well-growing plant can make us better beings—physically, mentally, and emotionally. A green wall system that manages itself and is a living wall can make the world cooler and healthier. In November 2014, Veera received the Outstanding Science Alumni 2014 award from National University of Singapore. Veera discusses the roots of Greenology, his view on the current state of green affairs, and how much greener the world can become.

“Greening the world, one wall at a time.” Why is that important to you?

I am a trained botanist. I study and understand plants. I know the expansive potential that plants have that can really impact our urban environment. I do stand by the belief that no matter the size of the greenery, whether just one green wall within an apartment or the whole façade of a building, its effect is affective and long-lasting. We already recognise the multitude of benefits plants have in a home environment. Health-wise, the therapeutic and physical benefits of plants have long been proven and studied.

In the same breadth, the expanse of green applied on a surface of a building has proven its worth in reducing carbon in the air. Due to plants' natural process of photosynthesis, the absorption of carbon during this process really allows plants to act almost like a suction source, absorbing all the carbon that has been emitted into the urban environment. Not only that, but the natural gaseous exchange that occurs in plants actually “attracts” dust and air-borne particles to collect where plants reside. So wherever plants are, whatever the scale, they can only be a benefit to our urban environment.

What are some of the misconceptions about the work that you do?

For a start, there are still some who think that Greenology is a landscape contracting company, and others who assume Greenology is a nursery that sells plants that can grow vertically. We are neither. Greenology is an urban greening solutions provider. We give holistic consideration to the viability of a greening solution in any urban context. I believe that the positive integration of any urban architecture with urban greening would result in a positive change in the urban environment that we live in.



1. A reconstruction in 2012 of two conserved shophouses into a boutique office at 48 North Canal Road includes this urban park.

2. Green walls at the F1 Pit building, reinstalled in 2010 by Greenology when its previous plantings failed to flourish, now thrive.

3. The Heeren's fire escape stairwell is furnished with 435 square metres of Greenology's green wall system, the first to be fireproof in Singapore, completed in 2014.

4. Tanglin Trust School features an 84-square-metre vertical garden completed in 2012. The plants were chosen for their suitability for the wall, aesthetics, and educational value.



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If plants are truly that effective, can green walls then contribute to the world's goal of achieving zero-energy buildings? Can green walls bring us closer to that goal?

Green walls can definitely contribute to bringing energy consumption down. The logic is quite simple: an external green wall acts like a heat absorber. In Singapore, the exposed surface areas of buildings, especially in concrete walls, are primed to absorb and trap heat throughout the day. Most buildings here are not designed to insulate the interior from the external heat. As a result, this build-up of heat in the day is in turn conducted into the interior of the building, causing the need for increased cooling systems. A green wall, by its sheer presence, would serve as an insulating layer between the sun and the concrete façade wall and in turn result in a temperature differential between the external and internal spaces. This is reflective of the nature of micro-cooling that we can feel when we stand under the protective shade of a rain tree, for example.

Why green walls in specific then? Do they have the same effect as a collection of potted plants in our house, or a soil garden filled with shrubs and plants?

Of course you can choose to have potted plants in the apartment or home. The result is the same, except from a density viewpoint, with apartments getting smaller and more expensive, every squarefoot of footprint in the apartment is valuable. Just as an illustration, a sum of potted plants in an apartment would take up about 25 square feet of actual floor space. With the average price of property now valued at \$1000 per square feet, this simply means that the plants actually cost \$25,000 worth of floor area. Now that sounds quite ridiculous, especially if the cost price of those plants is only a few hundred dollars. So rather than losing actual usable floor

space, the potted plants can be replaced by a green wall, which can expand to a complete wall surface of area 90 square feet. Without costing a fraction of \$25,000, and at the same time, by freeing up usable floor space and for living with better air quality, a green wall is clearly a sensible urban choice.

Even with a soil garden, which is a desired privilege in land-scarce Singapore, there are still practical constraints to having a "live" garden within the house itself. So over and above a soil garden, a green wall would prove to be a welcome addition of green. And with the soilless system we have developed, GMatrix, an engineered plant-growing media that is made from a combination of structural organic and inorganic components, the green wall can be kept free from diseases and pathogens. Problems associated with water-clogged soil and fungus growth arising from damp and poorly aerated soil are completely eliminated.

Greenology has developed its own green wall system: GVG (Greenology Vertical Greenery). This consists of a built-in irrigation and fertiliser drip system and a plant-growing media that is soilless. It seems that the system can be applied broadly, but are there conditions and sitings where a green wall is not an appropriate solution?

GVG is a system that is applicable not only in Singapore but also in other countries as well. One of the main factors needed for healthy plant growth is sunlight. In light-abundant countries like Singapore, this is usually not a deficiency that GVG has to deal with. Even in shadowed conditions within an apartment, GVG can also be used, in tandem with GGL (Greenology Grow Lights). GGL are LED lights specially designed for optimal plant growth.



Rather, the few conditions that would be inappropriate for a green wall are usually aesthetic ones. Sometimes within a small apartment, an overly large green wall that dominates a space can appear overbearing and too imposing. This would actually work against the basic premise of having a green wall in a home to soothe the mind and ease the daily stress we all experience. On an urban scale, sometimes the existing structural framework of a building façade is just not able to be adapted to carry the additional load of a green wall. In other buildings, the façade may be virtually inaccessible, due to its sheer height. These would all pose conditions where a green wall would not be appropriate or applicable.


The GVG system is already well established now. I understand Greenology is now setting its sights on urban farming and agriculture? Please share more with us.

Arising from a similar concern, that land is scarce in Singapore, the issue of food security is a clear and present concern. Vegetable farming, in the traditional sense (on open land) is not practical here. With little land to spare, the alternative route to take for farming is to eliminate the reliance on soil. From this, we have started our research and development in urban farming. When vegetables can be grown in soilless conditions and under controlled environments such as controlled lighting and water irrigation, the growth time for vegetables can be reduced significantly.

Our farming “laboratories” can now grow vegetables in racks, layered one above another. The same footprint can produce almost

four times the amount of vegetables grown, since they are stacked up vertically. This way, there can be increased supply in reduced time. These would all contribute greatly to the food security of Singapore. We are also researching the possibility of a “complete” system, in which the fertilisers for the vegetables are actually from a natural source, derived from the output of fish, entirely powered by solar energy. We are currently testing this out, by rearing fish in a tank directly connected to the fertiliser irrigation system.

Looking beyond 2014, what is the research agenda that Greenology would like to tackle?

Well, with the movement into digital and remote-controlled environments, Greenology is looking into the possible development of online remote-controlled timer systems that are attached with the green wall. In particular, this would be applicable to large-scale green wall projects, for example, in hospitals and the airport. When the area of green wall is very large, any unexpected significant change in the environment, if affecting the green wall, would be quite invasive. For example, a few months ago when Singapore experienced very dry conditions, the pre-programmed water irrigation and fertiliser drip for green walls may not have been set at optimum intervals, since they were calibrated when the wall was installed, which could have been under different weather conditions a few years ago. In that situation, the timer should be recalibrated to meet the current weather conditions. If we could monitor the conditions of the plants online and effect a customised change in the timer programme, that would be most desirable. 



5, 6. The vertical farming laboratory at Greenology studies how to optimise plant growth, energy consumption, and harvest cycles, based on organic farming solutions and the use of solar energy, under low natural lighting conditions.

7. A green wall panel, featuring freshly planted *Anthurium* sp and other plants, being incubated before installation. During incubation, these plants are given time to grow further on the panels and accustomise to the medium on the panels.

8. Bromeliads often come in attractive hues with large shapes and would add a dash of riotous colour to a green wall.

9. Greenology founder and botanist Veera Sekaran.

10. Reindeer moss, which comes from temperate Europe, is available in five shades of green for moss walls.